

**AS Level Physics A**  
**H156/02** Depth in physics

**Question Set 1**

1. (a) Define what is meant by the *stopping distance* of a vehicle.

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.....  
.....

[1]

(b) Fig. 1.1 shows a train of mass  $1.9 \times 10^5 \text{ kg}$  travelling at  $61 \text{ km h}^{-1}$  along a level track.



Fig. 1.1

(i) Show that the train is travelling at about  $17 \text{ m s}^{-1}$ .

[1]

(ii) The brakes of the train are applied and the train is brought to rest in a distance of 310 m.  
Calculate

1. the initial kinetic energy  $E_k$  of the train

$$E_k = \dots\dots\dots \text{ J}$$

[2]

2. the average deceleration  $a$  of the train

$$a = \dots\dots\dots \text{ m s}^{-2}$$

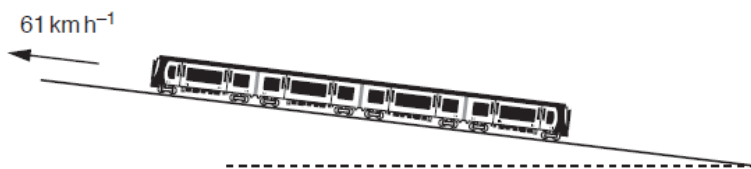
[3]

3. the average braking force  $F$  on the train.

$$F = \dots\dots\dots \text{ N}$$

[2]

(iii) Fig. 1.2 shows a similar train travelling at  $61 \text{ km h}^{-1}$  up an incline.



The brakes of the train are applied with the **same** average braking force. State and explain how the distance that the train travels, from when the brakes are applied until the train stops, compares with when the train is travelling on level track.

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[2]

**Total Marks for Question Set 1: 11**

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